

## **REMARKS**

### **1. Objection to the Specification**

In the Office Action mailed on February 17, 2005, the Examiner objected to the specification. In particular, the Examiner objected to the original abstract for including the word “means.” Applicants have amended the abstract to remove the word means. Applicants respectfully submit that the objection to the specification has been overcome.

### **2. Claim Rejection – 35 U.S.C. § 102(b)**

In the Office Action, the Examiner rejected independent claim 32 as anticipated by Negri et al. (U.S. Patent No. 4,142,494). Applicants respectfully traverse this rejection.

Independent claim 32 recites a “diffuser in fluid communication with and located downstream of said clean air channel.” The common definition of the term “diffuser” includes “a device for reducing the velocity and increasing the static pressure of a fluid passing through a system.” MERRIAM-WEBSTER’S COLLEGIATE DICTIONARY 323 (10<sup>th</sup> ed. 2002). In other words, a diffuser is “an expansion or area increase intended to reduce velocity in order to recover the pressure head of the flow.” FRANK M. WHITE, FLUID MECHANICS 345 (Anne Murphy et al. eds., McGraw-Hill, Inc.)(2<sup>nd</sup> ed. 1986). On page 3 of the Office Action, the Examiner stated that Negri et al. discloses “a diffuser (a portion of 18 connecting to an air cleaner 14).” However, Negri et al. discloses a “carburetor discharge plenum 18” of constant cross-sectional area having a bend or elbow prior to the turbocharger compressor 20. Bends and elbows typically generate system losses. Furthermore, Negri et al. does not disclose that the bend or elbow illustrated in Figure 1 provides an increase in area that recovers pressure head. Thus, Negri et al. does not disclose a diffuser.

Independent claim 32 as amended also recites “an expansion chamber in fluid communication with and located downstream of said diffuser expansion chamber.” The Examiner stated that Negri et al. discloses “a plenum (a portion of 18 directly connecting to turbocharger).” However, on Page 5 of the Office Action, the Examiner acknowledges that Negri et al. fails to disclose a “plenum having an increased cross sectional area relative to a cross sectional area of a portion of the air channel,” *i.e.*, an expansion chamber. Therefore,

claim 32 is not anticipated by Negri et al. and Applicants respectfully request that the rejection of claim 32 under 35 U.S.C. § 102(b) be withdrawn.

### **3. Claim Rejections – 35 U.S.C. § 103**

#### **A. Negri et al. and Ironside et al.**

In the Office Action, the Examiner rejected claims 1, 5, 14-15, 19, 25-31 and 34-36 as being unpatentable over Negri et al. in view of Ironside et al. (U.S. Patent No. 5,261,236). The Examiner also rejected claims 6-7 and 20-21 as being unpatentable over Negri et al., in view of Ironside et al., and in further view of design choice. Applicants respectfully traverse these rejections.

#### **i. Claims 1, 5-7, and 25-28**

Independent claim 1 as amended recites (1) an expansion chamber located within an area directly in front of the inlet of the turbocharger, (2) the expansion chamber having an increased cross-sectional area relative to a cross-sectional area of a portion of the clean air channel immediately proceeding the expansion chamber, and (3) the pressure head is restored within the expansion chamber to compensate for losses incurred from the airflow traveling at least a portion of the clean air channel such that the velocity of the airflow is increased immediately prior to delivery of the airflow to the turbocharger.

As noted above in Section 2, Negri et al. does not disclose an expansion chamber. Negri et al. also does not disclose using an increase in cross-sectional area to compensate for system losses incurred as the airflow travels at least a portion of a clean air channel, the area increase being intended to reduce velocity and restore pressure head such that the velocity of the airflow may be subsequently increased prior to delivery to a turbocharger.

The Office Action attempts to overcome the deficiencies of Negri et al. by relying on Ironside et al. Ironside et al. discloses a system in which air exits a plenum chamber 16 and travels the entire length of a duct of constant area prior to reaching a compressor 11. The duct of constant area would not restore pressure head prior to delivery of the airflow to the compressor. Moreover, Ironside et al. discloses a system in which the “plenum chamber 16 has an inlet 18 for receiving air from the atmosphere.” Ironside et al., col 4, ll. 47-49. The inlet 18 is not a part of a clean air channel containing primarily clean air as the air traveling through the

inlet 18 is coming directly from the atmosphere and has not passed through an air filter yet. Hence, Ironside et al. does not disclose a system having a portion of the clean air channel containing primarily clean air immediately proceeding an expansion chamber. Therefore, Applicants respectfully submit that even if one were to combine Negri et al. with Ironside et al., a number of claim 1 limitations would remain absent.

Furthermore, it appears that the Office Action may be suggesting the replacement of the plenum 18 of Negri et al. with the inlet 18 and air cleaner 16 of Ironside et al. However, such a replacement would not be necessary as Negri et al. has its own air cleaner 14 upstream of the plenum 18.

**a. Claims 5 and 25-28**

Claims 5 and 25-28 depend upon claim 1 and should be allowable for similar reasons. Additionally, claims 5, 27, and 28 recite a diffuser. A diffuser is “an expansion or area increase intended to reduce velocity in order to recover the pressure head of the flow.” FRANK M. WHITE, FLUID MECHANICS 345 (Anne Murphy et al. eds., McGraw-Hill, Inc.)(2<sup>nd</sup> ed. 1986). As noted above, Negri et al. does not disclose a diffuser. Additionally, contrary to what the Examiner suggests on page 5 of the Office Action, the inlet 18 of Ironside et al. is not a diffuser. The inlet 18 has a decreasing cross-sectional area, which would not reduce velocity and restore pressure head. *See* Fig. 1. Accordingly, neither Negri et al. nor Ironside et al. disclose a diffuser.

Claim 5 also recites a cone angle that establishes an expansion rate of the cross-sectional area encompassed within the diffuser. The Examiner acknowledged on page 5 of the Office Action that Negri et al. fails to disclose an “air channel comprising a conical diffuser with a cone angle that establishes an expansion rate of a cross sectional area encompassed within the diffuser.” Moreover, as shown in Figure 1, the inlet 18 of Ironside et al. does not expand, rather it contracts. Hence, neither Negri et al. nor Ironside et al. discloses a cone angle that establishes an expansion rate of a cross-sectional area.

Claim 25 as amended recites an air filter located upstream of the expansion chamber. Neither Negri et al. nor Ironside et al. discloses an expansion chamber that is separate from and located downstream of an air filter.

Claim 26 as amended recites the clean air channel redirecting the airflow, the direction of the airflow exiting an outlet of the air filter being at least approximately 180 degrees from the direction of the airflow entering the inlet of the turbocharger. Neither Negri et al. nor Ironside et al. discloses an air filter outlet directing airflow in a direction at least approximately 180 degrees from the direction of airflow entering a turbocharger inlet.

Claim 27 also recites an angular diffuser. Neither Negri et al. nor Ironside et al. discloses an angular diffuser.

Claim 28 as amended also recites a diffuser and an expansion chamber that both redirect the direction of airflow within the clean air channel. Neither Negri et al. nor Ironside et al. discloses a diffuser and an expansion chamber that are both capable of redirecting airflow within a clear air channel.

**b. Claims 6 and 7**

The Examiner rejected claims 6 and 7 as being unpatentable over Negri et al., in view of Ironside et al., and in further view of design choice. Claims 6 and 7 depend upon independent claim 1. As noted above, even if one were to combine Negri et al. with Ironside et al., a number of claim 1's limitations would remain absent. Applicants respectfully submit that design choice would not cure these deficiencies.

Additionally, the Examiner on pages 8-9 of the Office Action, states that “[o]ne having an ordinary skill in the turbocharged internal combustion engine art, would have found the cone angle being approximately 12 degrees, and in the range of approximately 4 to approximately 16 degrees, as a matter of design choice, depending on the engine requirements.” However, neither Negri et al. nor Ironside et al. discloses a diffuser or a diffuser having a cone angle. Accordingly, the combination of Negri et al. and Ironside et al., even if such a combination could be properly made, in view of design choice does not yield the additional limitations of claims 6 and 7.

**ii. Claims 14, 15, 19-21, and 29-31**

Independent claim 14 is a means-plus-function element and should be interpreted in accordance with 35 U.S.C. § 112, ¶ 6. Accordingly, the claims must be interpreted to cover the recited function. *See* MPEP § 2181.

Independent claim 14 as amended recites a means for (1) restoring pressure head to compensate for system losses incurred from the airflow traveling at least a portion of the clean air channel and (2) subsequently increasing the velocity of the airflow within the clean air channel in an area directly in front of the inlet of the turbocharger.

Neither Negri et al. nor Ironside et al. discloses or performs the recited function of restoring pressure head to compensate for system losses incurred from the airflow traveling at least a portion of the clean air channel. Furthermore, neither Negri et al. nor Ironside et al. discloses or performs the recited function of increasing the velocity of the airflow within the clean air channel in an area directly in front of the inlet of the turbocharger. Therefore, even if one were to combine Negri et al. with Ironside et al., a number of limitations of claim 14 would remain absent.

**a. Claims 15, 19, and 29-31**

Claims 15, 19, and 29-31 depend upon claim 14 and should be allowable for similar reasons. Additionally, claim 15 as amended recites an expansion chamber having a cross-sectional area being greater than a cross-sectional area of a portion of the clean air channel immediately upstream of the expansion chamber. Neither Negri et al. nor Ironside et al. discloses an expansion chamber having a cross-sectional area greater than an upstream portion of a clean air channel.

Claim 19 recites (1) a diffuser and (2) a cone angle that establishes the expansion rate of the cross-sectional area encompassed within the diffuser. As previously noted, neither Negri et al. nor Ironside et al. discloses a diffuser. Additionally, the Examiner acknowledged on page 5 of the Office Action that Negri et al. fails to disclose an “air channel comprising a conical diffuser with a cone angle that establishes an expansion rate of a cross sectional area encompassed within the diffuser.” Moreover, as shown in Figure 1, the inlet 18 of Ironside et al. does not expand, rather it contracts. Hence, neither Negri et al. nor Ironside et al. discloses (1) a diffuser or (2) a cone angle that establishes an expansion rate of the cross-sectional area encompassed within the diffuser.

Claim 29 recites an air filter in communication with an inlet of the clean air channel and located upstream of the means for restoring pressure head to compensate for losses

incurred from the airflow traveling at least a portion of the clean air channel and subsequently increasing the velocity of the airflow within the clean air channel in an area directly in front of the inlet of the turbocharger. Neither Negri et al. nor Ironside et al. discloses an air filter located upstream of a means for restoring pressure head and subsequently increasing the velocity of airflow within a clean air channel.

Claim 30 as amended recites that the airflow travels in a direction exiting an outlet of the air filter being at least approximately 180 degrees from a direction of the airflow entering the inlet of the turbocharger. Neither Negri et al. nor Ironside et al. discloses redirecting the airflow within a clean air channel 180 degrees from the outlet of an air filter to the inlet of a turbocharger.

Claim 31 as amended recites an angular diffuser in fluid communication with the expansion chamber at approximately a 90 degree angle between a direction of the airflow exiting an outlet of the angular diffuser and a direction of the airflow exiting an outlet of the expansion chamber. Neither Negri et al. nor Ironside et al. discloses an angular diffuser in fluid communication with an expansion chamber at approximately a 90 degree angle.

**b. Claims 20-21**

The Examiner rejected claims 20 and 21 as being unpatentable over Negri et al., in view of Ironside et al., and in further view of design choice. Claims 20 and 21 depend upon independent claim 14. As noted above, even if one were to combine Negri et al. with Ironside et al., a number of claim 14 limitations would remain absent. Applicants respectfully submit that design choice would not cure these deficiencies.

Additionally, the Examiner on pages 8-9 of the Office Action, states that “[o]ne having an ordinary skill in the turbocharged internal combustion engine art, would have found the cone angle being approximately 12 degrees, and in the range of approximately 4 to approximately 16 degrees, as a matter of design choice, depending on the engine requirements.” However, neither Negri et al. nor Ironside et al. discloses a diffuser or a diffuser having a cone angle. Accordingly, the combination of Negri et al. and Ironside et al., even if such a combination could be properly made, in view of design choice does not yield the additional limitations of claims 20 and 21.

### **iii. Claims 34-36**

Independent claim 34 is a means-plus-function element and should be interpreted in accordance with 35 U.S.C. § 112, ¶ 6. Accordingly, the claims must be interpreted to cover the recited function. *See* MPEP § 2181.

Independent claim 34 as amended recites a means for both (1) restoring pressure head after the airflow has traveled at least a portion of the clean air channel and (2) redirecting the airflow at least approximately 90 degrees from a direction of the airflow exiting the outlet of the air filter to a direction of the airflow entering an inlet of the turbocharger.

Neither Negri et al. nor Ironside et al. discloses both of these recited functions. Negri et al. discloses an elbow in the induction passage. However, an elbow would typically create additional system losses and not restore pressure head. Additionally, Ironside et al. does not disclose restoring pressure head after the airflow has traveled at least a portion of the clean air channel and redirecting airflow at least approximately 90 degrees. Therefore, even if one were to combine Negri et al. with Ironside et al., claim 34 limitations would remain absent.

Dependent claims 35 and 36 depend upon claim 34 and should be allowable for similar reasons. Additionally, claim 35 as amended recites a diffuser in fluid communication with an expansion chamber. As noted above, neither Negri et al. nor Ironside et al. discloses a diffuser in fluid communication with an expansion chamber.

Claim 36 as amended recites the clean air channel redirecting the airflow, wherein the airflow travels in a direction exiting an outlet of the air filter being at least approximately 180 degrees from the direction of the airflow entering the inlet of the turbocharger. Neither Negri et al. nor Ironside et al. discloses an air filter outlet directing airflow in a direction at least approximately 180 degrees from the direction of the airflow entering a turbocharger inlet.

#### **B. Negri et al., Ironside et al., and Beckley et al.**

In the Office Action, the Examiner rejected claims 2, 8, 16, 22, and 33 as being unpatentable over Negri et al., in view of Ironside et al., and further in view of Beckley et al. (U.S. Patent No. 6,158,082). The Examiner also rejected claims 3-4, 9-10, 11-12, 13, 17-18, and 23-24 as being unpatentable over Negri et al., in view of Ironside et al. and Beckley et al., and in further view of design choice. Applicants respectfully traverse these rejections.

**i. Claims 2 and 8**

Dependent claims 2 and 8 depend upon independent claim 1. As noted above, independent claim 1 is allowable over Negri et al. and Ironside et al. Beckley et al. does not cure the deficiencies presented by Negri et al. and Ironside et al. with respect to independent claim 1 because it does not suggest (1) an expansion chamber having an increased cross-sectional area relative to a cross-sectional area of a portion of a clean air channel immediately proceeding the expansion chamber, nor (2) restoring pressure head within an expansion chamber to compensate for losses incurred from the airflow traveling at least a portion of the clean air channel such that the velocity of the airflow is increased immediately prior to delivery of the airflow to the turbocharger. Therefore, dependent claims 2 and 8 should be allowable for similar reasons as independent claim 1.

Dependent claims 2 and 8 each recite a clean air channel that comprises a bell-mouth transition. Neither Negri et al. nor Ironside et al. discloses a clean air channel having a bell-mouth transition. Moreover, in Beckley et al. air is drawn into the plenum 60 directly from the atmosphere through the plenum inlet openings 68 without passing through an air filter. On the other hand, a clean air channel typically has an air filter or other mechanism for removing impurities from the air. Hence, Buckley et al. does not disclose a clean air channel. Therefore, even if one were to combine Negri et al. and Ironside et al. with Beckley et al., a number of limitations for claims 2 and 8 would remain absent.

**ii. Claims 3-4 and 9-13**

The Examiner rejected claims 3-4 and 9-13 as being unpatentable over Negri et al., in view of Ironside et al. and Beckley et al., and in further view of design choice. Claims 3-4 and 9-13 depend upon independent claim 1. Even if one were to combine Negri et al. with Ironside et al. and Beckley et al., a number of claim 1 limitations would remain absent. Applicants respectfully submit that design choice would not cure these deficiencies.

**a. Claims 3-4, 9-10, and 13**

The Examiner stated on page 7 of the Office Action that “[o]ne having an ordinary skill in the turbocharged internal combustion engine art, would have found the radius of the bell-mouth transition being approximately 20%, and from approximately 3 to approximately 30% of



the effective diameter of the inlet of the turbocharger; and said plenum has a cross-sectional area lowering flow velocity through said plenum to less than 75 m/s, as a matter of design choice.” However, neither Negri et al, Ironside et al., nor Beckley et al. explicitly discloses any of these claim limitations. Accordingly, the combination of Negri et al. with Ironside et al. and Buckley et al., even if such a combination could be properly made, in view of design choice does not yield the additional limitations of claims 3-4, 9-10 and 13.

The Examiner also stated on pages 7-8 of the Office Action that “there is nothing in the record, which establishes that the claimed dimension and cross sectional area, presents a novel of unexpected result (See *In re Kuhle*, 526 F.2d 553, 188 USPQ 7 (CCPA 1975)).” However, as the Federal Circuit noted, “[t]o require [an applicant] to include evidence and arguments in the specification regarding whether [a limitation] was a matter of ‘design choice’ would be to require patent applicants to divine the rejections the PTO will proffer when patent applications are filed.” *In re Chu*, 66 F.3d 292, 298 (Fed. Cir. 1995)(distinguishing *In re Kuhle*, 526 F.2d. 553). Furthermore, the Federal Circuit has stated that “evidence of a suggestion, teaching, or motivation to combine” “must be clear and particular.” *In re Dembiczak*, 175 F.3d 994, 999 (Fed. Cir. 1999). The Examiner has not explained what specific understanding or technical principle would have suggested the combination of Negri et al. with Ironside et al. and Beckley et al. Therefore, Applicants respectfully submit that the Examiner’s design choice rejections have been overcome.

**b. Claims 11-12**

The Examiner on pages 8-9 of the Office Action, states that “[o]ne having an ordinary skill in the turbocharged internal combustion engine art, would have found the cone angle being approximately 12 degrees, and in the range of approximately 4 to approximately 16 degrees, as a matter of design choice, depending on the engine requirements.” However, neither Negri et al., Ironside et al., nor Beckley et al. discloses a diffuser or a diffuser having a cone angle. Accordingly, the combination of Negri et al., Ironside et al., and Beckley et al., even if such a combination could be properly made, in view of design choice does not yield the additional limitations of claims 11 and 12.

Moreover, the Examiner also has not explained what specific understanding or technical principle would have suggested the combination of Negri et al., Ironside et al., and Beckley et al. *See, e.g., In re Dembiczak*, 175 F.3d at 999. Therefore, Applicants respectfully submit that the Examiner's design choice rejections have been overcome.

**iii. Claims 16 and 22**

Dependent claims 16 and 22 depend upon independent claim 14. As noted above, independent claim 14 is allowable over Negri et al. and Ironside et al. Beckley et al. does not cure the deficiencies presented by Negri et al. and Ironside et al. with respect to independent claim 14. Therefore, dependent claims 16 and 22 should be allowable for similar reasons as independent claim 14.

Furthermore, dependent claims 16 and 22 each recite a clean air channel that comprises a bell-mouth transition. Neither Negri et al. nor Ironside et al. discloses a clean air channel having a bell-mouth transition. As noted above with respect to claims 2 and 8, Beckley et al. also does not disclose a clean air channel. Therefore, even if one were to combine Negri et al. and Ironside et al. with Beckley et al., a number of limitations for claims 16 and 22 would remain absent.

**iv. Claims 17-18 and 23-24**

The Examiner rejected claims 17-18 and 23-24 as being unpatentable over Negri et al., in view of Ironside et al. and Beckley et al., and in further view of design choice. Claims 17-18 and 23-24 depend upon independent claim 14. Even if one were to combine Negri et al. with Ironside et al. and Beckley et al., a number of claim 14 limitations would remain absent. Applicants respectfully submit that design choice would not cure these deficiencies.

The Examiner stated on page 7 of the Office Action that “[o]ne having an ordinary skill in the turbocharged internal combustion engine art, would have found the radius of the bell-mouth transition being approximately 20%, and from approximately 3 to approximately 30% of the effective diameter of the inlet of the turbocharger; and said plenum has a cross-sectional area lowering flow velocity through said plenum to less than 75 m/s, as a matter of design choice.” However, neither Negri et al., Ironside et al., nor Beckley et al. explicitly discloses any of these claim limitations. Accordingly, even if one skilled in the art were to combine Negri et

al. with Ironside et al. and Beckley et al., the additional limitations of claims 17-18 and 23-24 would remain absent. Moreover, the Examiner has not explained what specific understanding or technical principle would have suggested the combination of Negri et al. with Ironside et al. and Beckley et al. Therefore, Applicants respectfully submit that the Examiner's design choice rejections have been overcome.

**v. Claim 33**

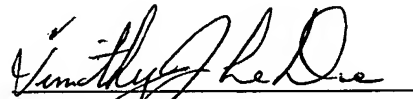
Dependent claim 33 depends upon independent claim 32. As noted above in Section 2, independent claim 32 is not anticipated by Negri et al. Beckley et al. does not cure the deficiencies presented by Negri et al. with respect to independent claim 32. Therefore, dependent claim 33 should be allowable for similar reasons as independent claim 32.

Furthermore, dependent claim 33 recites a clean air channel that comprises a bell-mouth transition. Neither Negri et al. nor Ironside et al. discloses a clean air channel having a bell-mouth transition. As noted above with respect to claims 2 and 8, Beckley et al. also does not disclose a clean air channel. Therefore, even if one were to combine Negri et al. and Ironside et al. with Beckley et al., a number of limitations for claim 33 would remain absent.

### SUMMARY

Applicants respectfully submit that all of the pending claims are in condition for allowance and seek early allowance thereof. If for any reason the Examiner is unable to allow the application but believes that an interview would be helpful to resolve any issues, the Examiner is respectfully requested to call the undersigned at (312) 321-4277.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Timothy J. Le Duc", written over a horizontal line.

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